CRITERION 602
ELEVATORS, DUMBWAITERS, AND LIFTS

SIGNATURES

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CRITERION 602
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1.0 PURPOSE

An elevator's usefulness is dependent upon user confidence and satisfaction. Assuring user confidence in the safety and reliability of elevators through minimizing malfunctions is the purpose of this criterion. This criterion will also guide the user in developing a systematic inspection, repair, and maintenance program for each unit. This document addresses requirements of LIR 230-05-01.

2.0 SCOPE

This criterion establishes maintenance inspection, and repair practices that are excepted by equipment manufacturers and standards agencies for elevators, dumbwaiters, and lifts.

3.0 DEFINITIONS

3.1 Abnormal Function
Any anomalous behavior detected during operation, inspection, testing, or maintenance.

3.2 Capacity
The maximum load that a unit is designed to carry (also known as rated capacity).

3.3 Corrective Maintenance
The repair of defective, failed, or malfunctioning units, or equipment to restore their intended function, or design condition. This form of maintenance does not result in a significant extension of a unit's expected useful life.

3.4 Dumbwaiter
A hoisting and lowering mechanism with a car of limited capacity and size which moves in guides in a substantially vertical direction and is used exclusively for carrying material.

3.5 Formally Removed From Active Service
Units locked and tagged out of service and de-energized, or locked away, tagged not to be used, and removed from the active list.

3.6 Frequent Use
The continuous, daily, or weekly use of a unit within its design parameters.

3.7 Lift (Material Lift)
A hoisting and lowering mechanism normally classified as an elevator which has been modified to adapt it for the automatic movement of material by means of an integrally mounted automatic transfer device.

3.8 Maintenance Cycle
The scheduled frequency upon which a unit is maintained.

3.9 Owner
The Facility Manager or Line Manager who is responsible for the unit.

3.10 Potentially Hazardous Condition
Any activity that could potentially cause harm, or damage to personnel, or property.

3.11 Preventive Maintenance
All systematically planned and scheduled actions performed for the purpose of preventing failure.

3.12 Sensitive Material
Items whose consequences of damage or destruction could lead to severe ramifications far beyond the damage, or loss of the specific item itself.

3.13 Unit
In the context of this criterion, a unit refers to an elevator, dumbwaiter, or lift.

4.0 RESPONSIBILITIES

4.1 Facility Manager

- Responsible for implementing a maintenance program in accordance with the requirements of this document.
- Responsible for facility systems and equipment addressed by this document and those programmatic systems and equipment which may be assigned to the FM in accordance with FMU specific Facility/Tenant Agreements.

4.2 Group Leader

- Responsible for implementing a maintenance program in accordance with the requirements of this document.
- Responsible for those programmatic systems and equipment addressed by this document for which they have responsibility.

4.3 FE-9 Facility Engineering Services

FE-9 is responsible for the technical content of this criterion and assessing the proper implementation across the Laboratory. FE-9 also provides technical assistance and support in the implementation of the listed requirements and guidance.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Nuclear facilities and certain high hazard facilities (e.g. high explosive operations) may have additional facility specific requirements beyond those presented in this criterion which are contained in the Safety Analysis Report (SAR), Technical Safety Requirements (TSR), or facility safety plans, as applicable.

5.2 Referenced Regulations

The regulations that govern inspection, repairs, and maintenance may be different depending on when a unit was installed. This criterion, therefore, cannot cite each requirement. The owner, or owner's designee, must become familiar with the provisions of the referenced regulations that apply to each specific unit under his/her jurisdiction. FE-9 can provide assistance with this effort.

6.0 REQUIREMENTS

6.1 Operations, Inspections, Maintenance, and Testing

Conduct operations, inspections, maintenance, and testing in compliance with the ANSI/ASME A17.1 code that applies to your unit's construction and installation date. (Refer to Appendix A for installation dates.)

6.2 Elevator Inspections

Inspect elevators every six months by a nationally certified elevator inspector, in compliance with ANSI/ASME A17.1 code requirements based on the elevator's installation date.

6.3 Dumbwaiter and Lift Inspection

Inspect dumbwaiters and lifts annually by a nationally certified elevator inspector, in compliance with ANSI/ASME A17.1 code requirements based on the units installation date.

6.4 Tests

Test elevators, dumbwaiters, and lifts in compliance with the schedule identified in appendix B.

6.5 Preventative Maintenance

Perform preventative maintenance at least annually. Frequently used

units, units handling sensitive materials, or units used routinely near their capacity are candidates for preventative maintenance more frequent than annual maintenance.

6.6 Corrective Maintenance

Repairs to units shall be made as soon as practical.

6.6.1 Abnormal functioning, or equipment defects discovered during operation, inspection, maintenance, or testing shall be reported to the unit's owner, or Facility Manager as soon as possible.

6.6.2 All potentially hazardous conditions disclosed through general observation, or inspection shall be corrected before use of the affected unit can resume.

6.7 Certificates

The certified inspector's certificate shall be kept by the unit's owner and be accessible for audit.

6.8 Training

Elevator, dumbwaiter, and lift maintenance shall be performed only by personnel trained to maintain the specific units assigned.

6.9 Units Not in Service

6.9.1 Removal From Active Service

Unused units may be locked and tagged out of service, de-energized; and removed from the active service list.

6.9.2 Reactivation

Units formally removed from active service (as indicated above in 6.9.1) are not required to receive inspections, maintenance, or testing until there is a need to use them. Such units are required to receive inspection, maintenance, and possibly testing, as identified below, before they can be used again, or returned to active service.

- Proposed use will be within six months of last certified inspection; exercise the unit before use (operate unit through two top to bottom cycles, open and close access). Correct all deficiencies before using unit.

- Proposed use will be beyond six months of last certified inspection; conduct a certified inspection. Perform maintenance as dictated by inspection findings.

6.10 Parts and Counterfeit Parts
Assure that replacement parts are at least equal to manufacturer's original parts and that no counterfeit parts are used on units.

6.11 Prohibited Usage and Maintenance Practices
The use of a unit outside of, or beyond its design parameters is prohibited (example: side loading). All maintenance shall be performed to reinstate the unit to its original level of operation. No temporary fixes.

7.0 RECOMMENDED GOOD PRACTICES

7.1 Units used less frequently than monthly should be exercised (operated through two top to bottom cycles, open and close access) monthly.

8.0 DOCUMENTATION

Facility Managers and unit owners shall maintain, for audit, records for all alterations, inspections, maintenance, and tests performed on each unit.

9.0 REFERENCES

ANSI/ASME A17.1, Safety Code for Elevators and Escalators.

10.0 APPENDICES

Appendix A: Code Years
Appendix B: Checklist for Inspection and Test of Hydraulic Elevators

APPENDIX A
CODE YEARS
ELEVATORS, DUMBWAITERS, AND LIFTS: INSPECTION AND TEST APPLICABLE INSTALLATION DATES HYDRAULIC ELEVATORS

The following indicates the applicable issue year of the ANSI/ASME A17.1 code that should be used in conducting inspections and tests.

HYDRAULIC ELEVATORS

TA	BLDG	
00	1325	EH-1 1994
00	1325s	EH-1 1994
2	1	EH-1 1952*
3	16	EH-1 1965
3	29	EH-1 1983
3	29	EH-2 1953
3	34	EH-1 1955
3	38	EH-1 1982
3	40	EH-1 1953
3	40	EH-2 1953
3	40	EH-3 1953
3	40	EH-4 1953/1988
3	40	EH-5 1990
3	66	EH-1 1959
3	66	EH-2 1959
3	66	EH-3 1959
3	66	EH-4 1959
3	66	EH-5 1959
3	66	EH-6 1959
3	105	EH-1 1957
3	123	EH-1 1961
3	132	EH-1 1961
3	132	EH-2 1961/1978
3	207	EH-1 1977
3	207	EH-2 1977
3	216	EH-1 1966
3	261	EH-1 1982/1985
3	287	EH-1 1970
3	422	EH-1 1977
3	502	EH-1 1988
3	1498	EH-1 1989
3	1498	EH-2 1989
3	1698	EH-1 1989
3	1698	EH-2 1989
3	2011	EH-1 1991
16	370	EH-1 1953
21	3	EH-1 1945*
35	2	EH-1 1951
35	2	EH-2 1951/1967
35	27	EH-1 1967
35	87	EH-1 1977
35	125	EH-1 1980
35	213	EH-1 1983
41	4	EH-1 1952
41	30	EH-1 1960
46	1	EH-1 1956
50	1	EH-1 1963
48	1	EH-1 1957
52	33	EH-1 1979
53	1	EH-1 1971
53	6	EH-1 1976
53	31	EH-1 1988
53	3-A	EH-1 1971
53	3-C	EH-1 1971
53	3-E	EH-1 1971
53	3-H	EH-1 1971
53	365	EH-1 1989
53	622	EH-1 1989
55	2	EH-1 1974
55	4	EH-1 1974
55	5	EH-1 1988
55	41	EH-1 1988
55	114	EH-1 1989
59	3	EH-1 1979

ELECTRIC TRACTION ELEVATORS

TA	BLDG		TA	BLDG	
3	29	EE-1 1953/1984	16	200	EE-1 1953/1985
3	43	EE-1 1956/1985	43	1	EE-1 1953/1983
3	43	EE-2 1956/1985	60	19	EE-1 1986
16	54	EE-1 1946			

DUMBWAITERS

TA	BLDG		TA	BLDG	
3	29	DW-1 1959	16	200	DW-1 1953
3	40	DW-3 1953*	16	460	DW-1 1953
3	40	DW-2 1953	43	1	DW-1 1953
3	221	DW-1 1961*	50	1	DW-1 1963
3	502	DW-1 1988	59	1	DW-1 1967

LIFTS

TA	BLDG		TA	BLDG	
3	43	WL-1 1991	3	1698	WL-1 1991
3	43	WL-2 1991	52	33	WL-1 1993
3	43	WL-3 1991	60	1	ML-1 1983

EH--Hydraulic Elevator
EE--Electric Traction Elevator
DW--Dumbwaiter
WL--Wheelchair Lift
ML--Materials Lift
* --Units that had been removed from active service at the time of this document's development, 12/15/97.
1945, or 1952, etc. (A year):

Indicates the approximate year that a unit was installed. The ANSI/ASME A17.1 Code in effect on the indicated installation date shall be used to conduct inspections and tests.

1953/1988, etc. (A year/a year):

Indicates an original installation date and a unit modification date.

APPENDIX B
CHECKLIST FOR INSPECTION AND TEST OF HYDRAULIC ELEVATORS

(For direct plunger without safe ties or counterweights)

This checklist is to serve only as a **guide**. For complete requirements and test procedures refer to ANSI /ASME A 17.1 and ANSI /ASME A 17.2.

	CHECK	A17.1 RULE	A17.2 ITEM		
			Routine	Periodic	Acceptance
	INSIDE THE CAR				
1.1	Emergency stop switch	210.2(e)	101.3a	101.3a	101.3a
1.2	Car emergency signal	211.1	101.6	101.6	121.6 121.3
1.3	Rated load, platform area Capacity and data plate	207.1 207.3	101.1	101.1	121.1
1.4	Signs in freight elevator	207.5	101.1	101.1	121.1
1.5	Car enclosure	204.1 204.2 204.3	101.1	101.1	121.2
1.6	Ventilation of passenger elevators	204.2c	101.1	101.1	121.2
1.7	Side emergency exits	204.2d 301.7	101.1	101.1	121.2
1.8	Car door or gate	204.4 204.5 204.6	100.6	100.6	121.5
1.9	Car door or gate electric contacts	111.2	100.3 100.4	100.3 100.4	121.5
1.10	Closed position of car door or gate	111.7c 111.12	100.4b 100.2	100.4b 100.2	100.4b 100.2
1.11	Power opening of doors or gates	112.2	100.5 App. F	100.5	121.5 App. F
1.12	Power closing of doors or gates	112.3 112.4	100.5	100.5	121.5
1.13	Door reopening device	112.5	100.5	100.5	121.5
1.14	Car floor and landing sill	203	101.4	101.4	101.4
1.15	Operating control device	210.1	101.3 100.8	101.3 100.8	101.3
1.16	Emergency signal device	211	101.6	101.6	101.6
1.17	Car lighting (including emergency)	204.7	101.2a 101.2b	101.2a 101.2b	121.3 121.6
	OUTSIDE HOISTWAY				
2.1	Car platform guard	203.9	102.5	102.5	102.5
2.2	Power closing of hoistway doors	112.3	100.5	100.5	100.5
2.3	Door closing force	112.3a	-	119	121.5
2.4	Sequence of operation	112.6	100.5d	100.5d	100.5d
2.5	Hoistway enclosure	100.1	102.1 103.21	102.1 103.21	123.5 103.21
2.6	Hoistway doors	110.2	100.1	100.1	123.7

	CHECK	A17.1 RULE	A17.2 ITEM		
			Routine	Periodic	Acceptance
	OUTSIDE HOISTWAY (continued)				
2.7	Vision panels	110.7	103.13	103.13	123.7
2.8	Hoistway door locking device	111.1	100.2a	100.2a	100.2a
2.9	Elevator parking device	111.8	102.3	102.3	123.7
2.10	Access to hoistway	111.9	102.2 102.3b	102.2 102.3b	122.3
2.11	Emergency doors	110.1	100.7	100.7	100.7
	TOP OF CAR				
3.1	Top car clearance and refuge space	300.3	103.1	103.1	123.10
3.2	Stop switch top of car	210.2h	103	103	103
3.3	Top car operating device	306.2	103.14	103.14	123.2
3.4	Car top light and outlet	204.7a	03.14	103.14	123.1
3.5	Traveling cables and junction	102.1b	103.18	103.18	103.18
3.6	Speed limiting switch	305.2a 305.2b	-	115.2e	124.5
3.7	Door gate contacts, cams, etc. Hangers and connections	110	103.12 103.13	103.12 103.13	103.12 103.13
3.8	Hoistway clearances	300.3	103.20 App. A	103.20	123.4 App. A
3.9	Normal terminal stopping device	305.1	103.7	116.1	124.5
3.10	Top emergency exit	204.1e	101.1	101.1	121.2
3.11	Crosshead data plate	207.3 212.2a	103.3	103.3	123.6
3.12	Multiple hoistway	100.1d	-	-	123.5
3.13	Construction of hoistway	100	103.20	103.20	123.5
3.14	Floor over hoistway	100.3	104.4	104.4	104.4
3.15	Hoistway smoke control	100.4	103.25	103.25	123.5
3.16	Guide rails, fastenings, and alignment	301.1	103.10 103.11	103.10 103.11	103.10 103.11
3.17	Pipe, wiring, and ducts	102	103.23	103.23	103.23
3.18	Floor numbers	211.4	103.22	103.22	103.22
3.19	Landing sill guards, projections, and recesses	110.10 100	101.5 103.20	101.5 103.20	101.5 103.20
3.20	Broken tape switch	209.2c(2)	-	-	-
3.21	Car frame and stiles	203	103.16	103.16	103.16
3.22	Anticreep leveling device	306.3	203.1 App. F	203.1	203.1 App. F

	CHECK	A17.1 RULE	A17.2 ITEM		
			Routine	Periodic	Acceptance
	MACHINE ROOM AND MACHINERY SPACE				
4.1	Enclosure of machine space	300.2	-	-	124.6
4.2	Access to machine space	101.3	104.18	104.18	124.6
4.3	Pressure tanks	304.3	204.8	204.8	204.8
4.4	Head room in machine space	101.4	-	-	124.6
4.5	Lighting machine space	101.5a	104.18	104.18	104.18
4.6	Ventilation of machine and control space	101.5b	104.18	104.18	104.18
4.7	Guards for exposed equipment	104.1	104.8	104.8	124.6
4.8	Control valve	303.1	204.9	204.9	204.9
4.9	Terminal stopping device	209	104.10	116	124.5
4.10	Numbering of machines and disconnect switches	-	-	-	124.6 124.7
4.11	Physical ground, electrical equipment	210.4	-	-	124.7
4.12	Mainline disconnect	306.7	-	-	124.7
4.13	Pumps	-	204.1	204.1	204.1
4.14	Relief and check valve	303.2	204.3	204.3	204.3
4.15	Drives	-	204.2	204.2	204.2
4.16	Flexible hose and fittings	303.1d	204.4	204.4	204.4
4.17	Tank and oil level	304	204.5	204.5	204.5
4.18	Controller wiring fuses, etc.	-	104.15	104.15	104.15
4.19	Piping, wiring, and ducts	102	104.19	104.19	104.19
4.20	Piping supply line and shutoff valve	303.1 303.3	204.7	204.7	204.7
	PIT				
5.1	Pit light and stop switch	106.10 106.1f	105.1	105.1	125.3 125.4
5.2	Pit access	106.1d	105	105	125.6
5.3	Car clearance and runby	107	105.11	105.11	125.1
5.4	Construction of oil buffer	201.4	105.2	105.2	125.2
5.5	Oil buffer plunger return	201.4e	-	114.26 115.2	115.2
5.6	Oil buffer oil level gage	201.4f	105.2	114.29 / 115.2	105.2

	PIT (CONTINUED)				
5.7	Oil buffer data plate	201.4k	105.2	105.2	105.2
5.8	Spring buffer and data plate	201.3c	105.3	105.3	105.3
5.9	Solid bumper	201.2	105.4	105.4	105.4
5.10	Cylinder air relief	302.3f	-	-	-
5.11	Cylinder oil collection	302.2e	205.1	205.1	205.1
5.12	Pipes, valves, fittings, and supports	303.3 303.1c	204.7	204.7	204.7
5.13	Plunger	302.2	205.2	205.2	205.2
5.14	Plunger connection to car	302.2c	205.3	205.3	205.3
5.15	Normal stopping device	209.2	103.7	103.7	103.7
5.16	Guard between pits	106.1c	105	105	125.8
5.17	Pit access	106.1d	105	105	125.6
5.18	Illumination	106.1e	105.1	105.1	125.4
5.19	Traveling cable	210.4	105.12	105.12	105.12
5.20	Car frame and platform	203	105.13	105.13	105.13
5.21	Pit construction	106.1b	105.1	105.1	105.1
	TEST				
6.1	Bottom plunger clearance	1006.2d	-	-	220.3
6.2	Flexible hose and fittings	1005.3b	-	210.2a	210.2a
6.3	Oil buffer (a) Annual (b) 5 year (c) Acceptance	 1002.2a 1002.3c 1003.2e	 105.2 - -	 114.2 115 -	 - - 125.2
6.4	Terminal stopping devices	1002.2e	103.7	116	116
6.5	Firefighters' service	1002.2f	-	117	117
6.6	Emergency power operation	1002.2g	104.16	118	118
6.7	Power door closing force	1002.2h	-	119	119
6.8	Pressure tank (3 year)	1005.3c	-	210.2c	210.2c
6.9	Pressure switch	1005.3d	-	210.3	210.3
6.10	Recycle operation	306.13	-	-	220.5
6.11	Working pressure	1006.2b	-	-	-
6.12	Relief valve setting	1005.2a	-	210.1b	210.1b
6.13	Static load test	1005.2b	-	210.1c	210.1c
6.14	Emergency terminal speed limiting device	1005.2c(8)	-	210.2d	210.2d